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ABSTRACT

Significant concepts and emerging implications of technology, development of human capital, and visionary leadership can be applied to the design of vocational, technical, and occupational education to enable such education to meet the needs of today's information and service society. People without functional skills will be the technology illiterates of the future and will be at a serious disadvantage in the workplace. They will be the new have-nots. As the information knowledge base rapidly expands, the number of traditional jobs shrinks, and new jobs demand greater sophistication and preparation. The responsibility of dealing with these educational issues appears to be shifting to industry and the military, from civilian education, in the form of human capital development. Development of human capital provides the link between people achieving personal and career goals and organizations realizing enhanced productivity. Educators must abandon lock-step, competency-based curriculum and devise instructional strategies of higher order critical thinking skills. Education for sustaining an acceptable level of functional literacy will be an integral part of lifelong learning, and part of each worker's day will be devoted to training. Individualized education plans will link identified learning needs with applicable learning resources through online learning systems and networks. Appendices contain a listing of significant concerns, a schedule of presentations at the 1989 Summer Institute, and a second listing (and analysis) of concerns. (72 references) (CML)

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SYNTHESIS PAPER

Emergence of Vocational, Technical, and Occupational Education (VTO-E)

by

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A Paper presented to Nova University in partial fulfillment of the requirements for the Emergence of VTO-E Seminar

Nova University

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Section 1

REVIEW OF LEARNING GOALS

The main learning goal that was selected for study throughout the 1989 specialization seminar was to learn the significant concepts and emerging implications of technology, development of human capital, and visionary leadership to the design of education to meet the needs of today's information/service society. The intent was to grasp these concepts, to understand the implications, and to synthesize under the context of the emergence of Vocational, Technical, and Occupational Education (VTO-E). Selective practical applications were then related to the unique Army education and training mission of the U.S. Army Aviation Center (USAAVNC), Fort Rucker, Alabama. An additional learning objective was to learn from the Nova national lecturers, 1989 summer institute presenters, faculty, and attendees successful approaches for practicum and Major Applied Research Project (MARP) development.

Unit III was selected for study because it covers the unique concepts of functional literacy of a diversified workforce in an automated work place of the information/ service society. Today's emerging political, societal, and economic trends in this society significantly influence the design of education and impact on the emergence of VTO-E. These concepts are of special interest to the challenging

USAAVNC education and training mission which relates to the mission, goals, and learning objectives of the VTO-E system.

A study of Unit IV was desired because it emphasizes that the development of adequate information processing skills for individuals has a tremendous influence on society and that the design of education, especially VTO-E, should take this into consideration to fully support the needs of an information/service society. For the past 30 years, society has been going through changes where information products from the tools of technology is substituted for both energy/labor and material/capital as some form of productivity. Information has always been a resource, but a poorly understood one when compared to other more tangible resources. Knowledge is power but it is not clearly true that information is the equivalent of knowledge. An individual or small organization can now have as much information with its associated power that was once only available to government or a large industrial corporation.

Unit VI reinforces the idea that the design of education must change to provide graduates who have adequate higher-order comprehension (critical thinking) skills to meet the skill needs of today's work place. Information, processed into knowledge and wisdom, is a dominant resource in the U.S. and has potential for global power (Giroux, 1989:729). As organizations restructure around advanced technological systems, traditional industrial work skills become obsolete

by technological and social changes in the work place (Drucker, 1988:50-51).

Elective I was selected because it emphasizes the nature of today's changing and diversified workforce. The combination of a shrinking pool of entry-level workers with the 23 million adults who are considered functionally illiterate forces industry and the military to offer more comprehensive training of skills in the work place (Russo, 1988:2). The basic characteristics of the information/ service workforce is its polarization into "expert" and "non-expert" sectors; reinforcement of sex, age, and race segregation; erosion of internal job ladders; increased importance of credentials; skill restructuring; establishment of work place authority from demonstrated expertise and certified credentials versus industrial seniority and rank position (Newell, 1988:263-265).

Elective II involves prior learning that occurred during the research, assessment, design, and implementation of instructional technology (computer-assisted training) in the USAAVNC. Educational technology has reached a turning point of being just an exotic curiosity to the military to a very useful tool for improving instructional delivery. Recent advances in emerging technology have jolted the status quo of military education and training.

Section 2

ANALYSIS OF LEARNING OUTCOMES

Introduction

The analysis of learning outcomes includes a comprehensive reviewing of existing literature, understanding of emerging concepts, and a synthesizing of implications. The scope of this effort involves a working understanding of the USAAVNC education and training mission and a sensitivity toward the issues of functional literacy, information processing skills, and critical thinking in an automated work place with a changing diversified workforce (human capital) in today's modernized Army, a high technology industry, and an information/service society. The figure in Appendix A shows an analysis (ANALYSIS I) of significant concepts and implications of functional literacy, information processing skills, critical thinking, changing society, and computer-assisted instructional technology that was conducted before attendance at the 1989 summer institute.

However, the analysis of learning outcomes is a never ending process. Learning has occurred because cognitive and intellectual skills have been enhanced through the learning process during the specialization seminar and 1989 summer institute experience. The resulting learning outcomes and

competencies are constantly being applied to transform the USAAVNC education and training development work place. Motivation to learn occurs because the learning outcomes have timely practical application on the job and relevance to the changing needs of the USAAVNC education and training. This is significant because the military is the largest VTO-E in the U.S. with industry close behind (Mangum, 1987:425).

The above issues may require a rethinking of traditional views on the importance of formal, in-class training, adequacy of "hands on" experience, and excessive time away from the job (Baker, 1989:26). VTO-E strategies are needed to minimize the above issues, to increase the quality of the training that is provided, and to emphasize nontraditional methods of self-paced learning (Zemke, 1988: 60). VTO-E may even have to go to the work place in the form of on site education centers at many small information/ service type company locations, normally consisting of 15-35 employees.

Required Topics

A comprehensive review of Unit III provides an opportunity to learn the full scope of the functional literacy of individuals in relation to the changing nature of today's society. The real challenge to the design of the current education system is the critical need to train/ retrain workers for an information/service society (Russo, 1988:3). John Naisbitt (1984) in Megatrends points to a

"new respect for the individual" and a new networking style of management with each employee always at the center of a network influencing productivity or society as a part of the organization's human intellectual capital. A new post-industrial learning enterprise is replacing the worn out structured infrastructure of industrial-age, batch-processing education (Hodgkinson, 1988:170). The result is that a larger number of entry level, mid-career, and older employees will need retraining to maintain functional literacy and to achieve career expectations in the information/service work place and life goals within the context of today's fast-paced society (Fritz, 1988:10).

The nature of work is changing and the education system design, including VTO-E, is affected. The idea that hours of work directly translate into output is no longer valid (Pava, 1986:214-215). With advanced information processing systems, emerging technology, and networked smart databases, workers enhance output and productivity and now add a competitive edge within industry as human capital through more continuous and anticipatory activities, intellectual conceptualization, intrapersonal skills, team building, and systems design and modification under visionary leadership (Porter, 1986:13-14). This demands a functional literate worker who is comfortable around high technology and automation in the work place with a more sophisticated sense of loyalty, a higher level of comprehension (critical thinking), and intellectual skills than previously required.

Functional illiteracy is the inability of the individual to use effectively written information required for the emerging technical/automated workplace associated with our information/service society (Merrill, 1988:27). It is more than just being able to comprehend written materials or being at a certain reading grade level. It also involves the cognitive processes of reading complex and often technical materials (technology), interpreting the information for intended outcomes (conceptual thinking), and ultimately accomplishing the desired task successfully (productivity) in relation to its implications and effect in the individual's environment (Wright, 1988:267).

Functional literacy cannot be defined in static terms because of the emergence of ever increasing complex high technology and the proliferation of information processing systems and networks. Computer literacy is a significant consideration in functional literacy skills (Stoler, 1984: 13). However, the true requirement is the ability of the individual to cope with all types of computers, office automation systems, information processing networks, and telecommunications (Geroy & Erwin, 1988:34).

Employers must offer more than just remedial reading but skills enhancement training because they cannot find qualified human capital to fill entry-level jobs (Bushnell, 1988:20). Racial and ethnic minorities have unsatisfactory high rates of functional illiteracy, while the white

majority has the greatest numbers (Ayers, 1988:37). Functional illiteracy is greatest in the 20-to-39 age group (Nelson-Horchler, 1988:58). Employers normally uncover unacceptable skill deficiencies when they retrain their existing human capital on new emerging technology or information processing systems (Ponitz, 1989:8).

Although a great amount of timely literature exists to alert educators, it appears that both civilian and military education has lagged behind industry in adapting to the implications of the emergence of high technology and a fast-paced information/service society. Civilian, industrial, and military education must overcome this lack of functional skills by providing a truly functionally literate individual (human capital) comfortable with technology, automation, information processing, and eager for visionary leadership.

A study of Unit IV contributes to a better understanding of the significance of information processing skills in the development of human capital. Just as the spread of the telegraph, postal service, telephone, and typewriters created the conditions that allowed organizational structures to respond to the Industrial Revolution, so has information processing skills in relation to today's information/service society created a new type of organization. Information is a strategic tool that organizations must learn to use in these times of limited economic growth, increasing technological advancements, increasingly segmented society, and a changing system of

social values (Erkkila, 1989:26-27). Examples of successful organizations using information processing skills as a tool include the airline industry, health care, and insurance business (Meltzer, 1981:12). The implementation of new technology into this automated environment is facilitated by a participative change process, active technical structure, social support from peers and superiors, visionary leadership, and, of course, training on the skills necessary to operate the technology/automation to get the job done (Carnevale & Schulz, 1988:20,30).

Information processing skills include word processing, accessing and manipulating data/networks, spreadsheet analysis, "electronic mail," telecommunications, and videoconferencing. It also involves the cognitive processes of reading images and texts from the video screen or paper printout (reading), interpreting the information for intended outcomes (thinking), and ultimately accomplishing the desired task successfully (productivity) in relation to its implications and effect in the individual's environment (Geroy & Erwin, 1988:34). Thinking skills are critical to effective leadership in matrix organizations (DiMarco, 1989: 17).

Computer literacy is a significant consideration in the development of adequate information processing skills (Wiseman, 1987:132). However, the true requirement is the ability of the individual to access all types of technology in an automated environment to obtain the desired

information to enhance productivity (Kuehlmann, 1988:67). Unfortunately, the "socio-technical fit" between an individual's work environment and information processing skills is often badly matched to the needs of the individual (Luthans & Fox, 1989:28).

In their search for productivity and efficiency, many organizations are striving for "technical" solutions to difficult human tasks, like information processing. Organizations should be looking for the technology that works well with people to supplement their weak points in information processing and enhance their value as human capital (Farkas-Conn, 1988:50). Expected benefits have not been realized through office automation, development of individual information processing skills through the design of education, and information management (Weiner & Brown, 1989:10). The lack of training or measures of performance that reward information processing use can significantly influence the development of adequate skills (Newell, 1988: 266-268).

Although the automated office and high technology in the work place are available in many areas including word processing, desktop computers, electronic messages, voice mail, and videoconferencing, few organizations have taken full advantage of its potential for enhanced productivity or understood the implications on the development of human capital. The four door paper file cabinet is still prevalent. The projected "paperless office" has not

happened for many reasons (Brown, 1989:1). A fully integrated office enables an organization to streamline its organization and eliminate unnecessary levels of management (Pollick, 1982:38).

Unit IV emphasizes that the ability to think critically in the solution of problems is one of the most important abilities in today's fast paced society of technology, automation, and information processing (Elmandjra, 1987:60). Individuals developing skills in critical thinking not only enhance survival in the job market as human capital but also assess, criticize, and take better control of their lives in society (Mayes, 1987:11).

In a bureaucratic/industrial organizational model, predictability and comfort of a 30-year career path is the expected norm (Drucker, 1988:47). Flexibility, innovation, global outlook, and uncertainty prevail in the information/ service model characterized by thinking, energetic, competent, and entrepreneurial individuals (DiMarco, 1989: 17). This ability to conceptualize the implications of the data and use the information, not merely just having it, makes the difference in productivity (Shuster, 1988:68). In the military, this ability can enhance the functional efficiency of individuals responsible for day-to-day operations and even overall doctrine and strategy development (Metz, 1989:9).

More automation, information processing, and service work will prevail instead of the traditional industrial

production work (Clabaugh & Rozycki, 1989:7). The jobs left are information/service work that requires brainwork, conceptualization, intellectual performance, and critical thinking--uniquely human functions--that automation or "expert" systems can only help (Naisbitt, 1984:22).

In both industry and the military, the worker must be flexible, self-directed, creative, willing to learn new skills, and a thinker (Gould, 1989:31). The normal personnel makeup in today's work place is these kinds of workers with good critical thinking skills in small organizations of twenty-five people or less being more productive to meet the information/service needs of society than the industrial giants of the past (Concilio, 1988:39).

Elective Topics

Elective I provided insight into the changing and diversified society, specifically the work force. Demographic changes provide most educational information when thinking strategically in the near term, far term, and future timeframes (Duckett, 1988:166). Demographic shifts and implications can be easily predicted and are especially useful information because they rely on those already born (Foster, 1988:39).

While the "baby bust" of the 1970's reduces the pool of entry level workers, the number of middle-aged "baby boomers" increases nationally by 50 percent between 1975-1993 (Kutscher, 1987:6). They aspire to mid-management jobs

previously promised in traditional industrial organizations, but these jobs are declining because of the active streamlining of information/service organizations for productivity under automation (Nelson-Horchler, 1988:58).

A million working-age immigrants enter the U.S. each year, many of them with limited language and job skills while 700,000 youth drop out of school each year (Russo, 1988:2). Three of every four people now in the workforce will be still there in the year 2000 and will require training/retraining to fill jobs created by changing technologies as the economy becomes complex, dependent on human capital, and more competitive for scarce resources. The fourth person (the new worker) will by and large come from a group that requires literacy and job-related education and specific skills training to be productive: the aged, women returning to work, immigrants, and unskilled workers. Young people entering the workforce now will change occupations about four times during their careers and two of these occupations do not even exist yet (Herren, 1989:50).

Many skilled jobs already cannot be filled and inadequate reading, writing, mathematical, and thinking skills (functional literacy) limit the adaptability of great number of employees (Reich, 1988:24). The demand for U.S. business to be competitive internationally and the need to reverse a declining rate of productivity are placing new expectations on the education system including VTO-E (Cetron, 1985). A

growing feeling exists that education must make a greater contribution to the nation's technical, economic, and social development.

Workers must acquire comprehensive knowledge (expertise) to efficiently use office automation and high technology in the work place (Rockart & Short, 1989:9). The basic characteristics of today's organization in the information/ service society is the polarization of the diversified workforce into "expert" and "non-expert" sectors; reinforcement of sex, age, and race segregation, erosion of internal job and career ladders; increased importance of credentials; skill restructuring; establishment of work place authority from proved expertise and certified credentials versus seniority and rank position. Women, racial minorities, and the aged are disproportionately found in the non-expert, deskilled jobs, underemployed and unemployed.

People will be pressed to update their education and the lack of adequate emerging VTO-E may lower morale and productivity. VTO-E must assume more responsibility for accelerating learning and for speeding acquisition of on-the-job experience and networks that allow learned skills to be put to effective use (Hodgkinson, 1987:8-10).

Elective II involved prior learning that occurred during the research, assessment, and implementation of new educational technology (computer-assisted training) into the USAAVNC. Technology is the trigger that affects all aspects

of the information/service society. The Army is grasping this expensive technology through a big investment to enhance its war-fighting capabilities. The technical and tactical training for this emerging high technology will require special considerations in educational technology at the USAAVNC. Educational technology is of special interest because of its potential application in training soldiers to think at the work place and conceptualize doctrine with guided self-directed learning in a highly interactive learning environment. However, this educational technology will never be allowed to dehumanize the teaching and learning process (Reeves, 1986:102). In Army education and training, the instructor will always be present in the learning environment to augment any educational technology.

The status quo of Army education would have remained the same except for three recent developments that are driving or triggering Army acceptance of this wave of technology into its war-fighting ranks, educational institutions, and training bases (Zemke, 1987:52-53). Technological hardware costs are more acceptable. The number and quality of traditional curriculum related programs are increasing. Education, overall, is experiencing a "computer revolution." Even more acceptance is anticipated with emerging artificial intelligence, expert systems, authoring menus, "finger-on-glass," notebook computers, speech processing, and telecommunications (Smith & Dunn, 1985:7-8).

Army educators tend to tailor the use of technology to

the dimensions of traditional classroom practice and standard textbook curricula (Lindsey, 1984:19). However, automated and human instruction are qualitatively different with advantages, disadvantages, flexibilities, and limitations. The best features of the two should be used together in the classroom (Olfiesh, 1987:5-7). Humans are highly interactive, flexible, and adaptable. Technology is reliable, tireless, specific, and consistent. Effective use of this technology must have well-thought out learning outcomes/competencies describing a change in attitude/value or skill/knowledge level that the student will have after receiving the instruction.

A structured plan for getting the most educational benefit was formulated well in advance to accommodate interests in functional literacy, information processing skills, critical thinking, technology, development of human capital, visionary leadership, and practicum/MARP development. Emphasis was on maximizing learning outcomes to understand these interests in relation to the at-risk student. See Analysis I in Appendix A to understand these interests. See schedule of presentations attended in Appendix B. The learning outcomes from the 1989 summer institute presentations emerged as significant value to the original learning goals and are discussed in Section 2. See Analysis II in Appendix C to understand full scope of learning outcomes from the presentations.

1989 Summer Institute

The common thread through out all the components of the 1989 summer institute presentations was the importance of preparing the workforce as productive human capital and members of a global society for 2001 because of the impact of technology on all areas of society. This preparation must include the at-risk students because of demographic trends of the workforce and potential adverse social implications if they are not included in some chance of achieving the American Dream or, at least, enhancing their socio-economic status. Review of relevant literature revealed that society and education normally maintain status quo until the arrival or accommodation of technology and thus shown that change is required. Then, the implications emerge to be significant enough to affect the workforce and work place, to increase the number of at-risk students, and, thus, to change ultimately the design of the education system, including VTO-E.

Manual J. Justiz, Chaired Person of Higher Education, University of South Carolina, presented the keynote address on the subject of "Minorities in Higher Education: Confronting a Time Bomb." His words had a tremendous impact on the attendees during the presentation and set the learning atmosphere for the rest of the 1989 Summer Institute, "Preparing the Workforce for 2001: Educating the

At-Risk Student." The future design of the education system must be sensitive to emerging demographics, full articulation, multi-cultural institutional climate, and some form of enlighten financial help. The aging workforce in America has a vested interest in protecting their standard of living during their old age by ensuring that racial minorities, women, and immigrants are well educated and have fair access to the American Dream.

John Losak, Miami-Dade Community College, asked questions during his presentation, " Raising Questions About High Risk Students," on how well today's education system is prepared to educate and train the at-risk students. The measures of effectiveness or success to justify the effectiveness of educating and training the at-risk student are difficult to determine. Outcomes of remedial programs often fail to be easily justified through systematic research, empirical data, and statistical analysis. As a result, remedial effort is not the same across all educational system.

Dick Fairly, Department of Education, orchestrated a series of problem-solving exercises during the week on addressing the problems of the educational system for 2001. These three exercises provided the opportunity to work as groups of fellow educators with the same feelings and perceptions according to the Myers-Briggs survey completed before attendance at the 1989 summer institute. The results of this effort created a cooperative atmosphere where many

diverse and significant concepts and potential implications were provided at the end of the week. Dick Fairly emphasized that institutional and personal strategies for maintaining vitality represents an important part of visionary leadership.

The implications of technology on education surfaced throughout the preparation for the 1989 summer institute, the Nova presentations, and discussions with peers, presenters, and Nova faculty at the 1989 summer institute. All were awed by the significance and scope of technology envisioned for the 2001.

The development of human capital emerged during the 1989 summer institute as a relevant dominant theme to today's society. David L. Zierath, University of Wisconsin, discussed the elements of the at-risk population. The work place is aging; changing educational levels, values, expectations, loyalties; and is becoming more diversified. Earl L. Wright in his presentation "Imperative for the Year 2001," emphasized that leaders must learn how to relate to a growing workforce diversity with more women, minorities, the aged, and fewer workers from the "traditional" family backgrounds. Where once the workforce was loyal, credulous, thrifty, and essentially obedient, the workforce is now self-centered, distrustful, more prone to spend than save and more challenging of authority. The power elite of today's society must value human resources and motivation of these resources as an organizational responsibility.

Innovation must be change oriented and creative through an adaptable and flexible methodology to today's changing society. Poor development of human capital is threatening to those elites in power in today's society.

Kenneth E. Vancoe, Pennsylvania State University, in both his presentations on "The Preferred Future: Actions Today to Prepare the Workforce for 2001" and "The Learning Society: How Will Teaching and Learning be Different in the Year 2001" emphasized that visionary leadership involving environmental scanning, internal organizational auditing, and strategic planning is required to create the vision of where we want to be.

Warren Groff, as the national lecturer for the "Emergence of VTO-E," presented some key points both at the beginning and end of the 1989 summer institute. Education is both a "safety valve" for our dynamic society and a means to achieve the American Dream or at least enhance socio-economic status. The education system affects the daily lives of more Americans than any other social organization in the U.S. Millions more participate in lifelong learning in corporate training or universities. One in four Americans is either employed in education and training or participating as a student.

Education has always been perceived as means for achieving upward mobility, socially and economically, and the means to improve an individual's socio-economic status. Lawrence A. Nespoli during his presentation, "Investing in

Human Capital: Public Policy That's Good for the High-Risk Student and Good for the Nation's Economy" attempted to explain the idea of human capital. How do we measure wealth in the U.S.--material goods versus human capital (human beings)? Human capital can be defined as knowledge, motivation, skills, and energy that can be harnessed over time to produce material, goods, and services to meet the needs of today's society. Most educational studies woefully underestimate the rate of return or real contribution of education to organizational mission and productivity. The real mission of the design of education should be to place the power of knowledge inside each individual while also allowing education to simplify the individual's fulfillment of his/her destiny. The design of education must adapt to producing better human capital for greater productivity and enhanced ability to be competitive in today's global society. Education will have to be more sensitive and responsive to social concerns, ethnic groups, changing values, and other cultures.

Barton R. Herrscher, University of Houston, presented an excellent overview on curriculum integrity and the importance of reducing the unproductive nature of curriculum with the at-risk student. The key elements of curriculum integrity are--establish outcomes to teach to, target to the needs of students, make the curriculum do the job for the students, be consistent with education mission, be vertical in structure, and be in an effective sequence of courses.

The essence of curriculum is to understand the desired human competencies that students must learn to function effectively in today's society.

The practicum and MARP development presentations by Anita G. Barrett, Valda M. Robinson, and Ronald A. Newell provided outstanding information to get the practicum and MARP writing started. Their knowledge and practical applications expertise in these areas helped tremendously in getting the effort going. They were even available to read some draft practicums for comments and advice to make them better.

Section 3

SYNTHESIS OF LEARNING EXPERIENCE

Introduction

The emergence of relevant VTO-E must take into account the ever changing nature of society and the resulting implications to the design of education and contribution to society. There is nothing new about the world changing from one society to another because the world has gone through these societal changes in the past (Toffler, 1980:29-32). However, the unique and challenging aspect of this current change is its accelerated pace and emerging implications of technology, development of human capital, and visionary leadership to the design of education in today's fast-paced society and information/service work place. The emergence and accommodation of high technology, office automation, and information processing systems in the information/service work place appears to be the trigger for this rapid change, a significant influence on human capital development, and potential impacts on the design of education, including VTO-E.

Although a large amount of timely literature has emerged over the years to alert educators worldwide of this changing society and the emergence of a high technology work place, it appears that both military and civilian education (including VTO-E) has lagged behind in adapting to the

implications and unique education needs of today's society, including at-risk students. Centers of political, economic, and societal power have shifted from Detroit (industrial) to silicon valley (technical) to New York (information/ service). Access to information and the knowledge of how to use this information have provided opportunities for power, influence, success in life, an improved socio-economic status, and a chance at the American Dream for people who have the necessary workforce skills.

The lack of strategic planning, preferred scenario development, timely adaptability, and enthusiastic visionary leadership represent significant problems in the acceptance and accommodation of this technology emerging in today's changing society. Technology provides the trigger to impact all aspects of today's society. Visionary leadership provides the means to successfully adapt to the implications of this technology in society. The design of education may provide the answers to meet the challenge of the year 2001 and beyond.

Technology

The common thread through out all the components of the 1989 summer institute was the impact of high technology on all areas of today's changing society and automation in the work place. Review of literature revealed that society normally maintains status quo until the arrival or accommodation of technology. Then, the implications emerge

to be significant enough to affect individual life styles, stages, and careers and, ultimately, the design of education.

The implications of technology on education surfaced throughout the presentations and discussions with peers at the 1989 summer institute. Nova national lecturers, summer institute presenters, faculty, and attendees were awed by the significance and scope of high technology in their lives, careers, and work place. The presentation, "The Computer Illiterate as an At-Risk Entity: The New Have Nots," by Dale L. Cook had a tremendous impact on the attendees during the presentation. It showed the power and capabilities of being computer literate in today's society and how these skills can increase an individual's socio-economic status. This presentation clearly showed the power of technology to achieve the American Dream using the best productive features of technology.

People without functional skills will be the technology illiterates of the future and at a serious disadvantage in the work place and within their life style, stages, and careers (have nots). This educational dilemma is becoming more acute for VTO-E as the information knowledge base rapidly expands, the number of "traditional" jobs shrink, and new jobs demand greater sophistication and preparation. The responsibility of dealing with this educational issue appears to be shifting to industry and the military from civilian education in the form of human capital development.

Accommodation of technology will drive the design of education and implementation of credible human capital development. The development of human capital should be well grounded in broad knowledge areas, higher-order comprehension (thinking) skills, information retrieval techniques, and problem-solving concepts. The future of the development of human capital complements both the best of "hi-tech" and "high touch" (Megatrends, 1984).

Development of Human Capital

Development of human capital provides the means to bridge the gap between the implications of emerging technology and the design of education within society. Its development also provides the critical link between people achieving personal and career goals and organizations realizing enhanced productivity. Unfortunately, many people, today, feel that they operate in organizations that are too big and complex to influence personally. Their work place environment and life and career stages are directed by circumstances beyond their control. However, this view must change because the "new" information/service organizations must have a vitality and a common element of strategic planning (visionary leadership) that provides a credible personal and collective vision of the future.

People using the latest state of the art technology, automation, and information processing systems with access to multiple databases now have as much power as governments

and large industrial corporations once had in their absolute access to information and knowledge. All this is possible with little investment in hardware and software at their home (electronic cottage) or in their work place (automated office). Each individual is becoming a specialized resource of human capital that is more information dependent, more innovative, more responsive, and interconnected through multiple information/service channels.

The Army emphasizes a distinction between training and education. Training is a process in which people are assisted in learning technical knowledge, skills, and expertise for credentials to use technology and modernization. Education is the process of helping a person in developing mentally, intellectually, or morally. This distinction is crucial because critical thinking skills are developed through the education process (Gayeski, 1988:2).

The development of employees' critical thinking is necessary to make people the most valuable resource (human capital) in an organization. Without good knowledge (expertise) training, technology becomes useless (Georges, 1989:45). For example, today's sewerage plant technician needs to know more nowadays than just step by step mechanical procedures of turning valves at designated times but he/she must now be able to apply knowledge--fluid mechanics, system design, electronics, switching theory, decision-making--in the integration of the technology tools in his/her work place. People, as human capital, must be

educated to think conceptually and independently so they can generate solutions and alternatives to problems that are now unknown (Carter, 1988:27).

The emerging information/service careers depend more on not what you know, but how well you can appear knowledgeable (Hamel & Prahalad, 1989:75). Leadership, credibility, and authority derive from such sources as information, credentials, expertise, connections, creativity, charisma, intellectual skills, and critical thinking (Hirschhorn, 1984:146). "Expert" workers can also force a "deluge of data" and an "information value" crisis to make sense of all the information and resulting power in today's information/ service organizations (Zuboff, 1988:288).

Education (especially VTO-E) represents the means to learn the necessary work place skills to work productively in this type of society and increase individual socio-economic status as a part of fulfilling their perception of achieving the American Dream. The unique education design requirements for emerging technology, dynamic workforce skills, and effective innovation in the work place remains a positive force to get all people involved with this exciting new society (Carnevale, Gainer, Meltzer & Holland; 1989:29). The strong hands and willingness to work of the entry-level and career worker is not enough for productivity. So much of the emerging technology at home, work, and play is so new and critical that people must learn quickly to grasp complicated ideas and conceptually use this high technology

in an effective manner while it is being implemented (automation) in front of their eyes. The development of human capital is the means for individual(s) to maintain currency in workforce skills and keep pace functionally with the emerging technology that will allow them to attain life and career goals. The design of education in the military, industry, and civilian community must pull together to contribute to people being able to attain these goals, have some chance at achieving the American Dream, and, ultimately, improve society.

Visionary Leadership

Strategic planning must occur in order to carry out real change in the design of education for effective human capital development and optimal utilization of technology. More training for people in interpersonal skills is needed to develop good human relations skills and to actively engage in difficult and challenging problem-solving situations through team building. Education must develop a willingness to take risks and be a disrupter of the comfortable status quo within education.

Intuitively, the education environment, especially VTO-E, should be an active ground for change and visionary leadership, but it is often like any organization that is more comfortable maintaining an atmosphere of status quo. Unfortunately, visionary leadership in education is often viewed as only required when a need exists to accomplish a

selected goal. Leadership must not be a haphazard affair, randomly used, or saved for great goals to be accomplished under duress. The lack of leadership is an unnecessary deterrent to the emerging innovations in education so necessary for today's society.

The arrival of technology runs the risk of not being accepted or viewed as unsatisfactory under ineffective visionary leadership. This adversely affects any sincere attempt at carrying out real change within education. The educational environment, like most other organizations, tends to actively support an atmosphere of maintaining the status quo while just going through the motions of carrying out innovative ideas.

Strategic planning provides the key to effective use of technology with innovation to enhance organizational productivity and individual quality of life. It occurs any time an individual attempts to "influence the behavior of an individual or group(s) for one's own goals, those of others, or organizational goals, or even a combination of all the goals" (Hersey & Blanchard, 1982:3). Critical leadership skills include forecasting or "visioning" (Blanchard & Peale, 1988:86), influencing blocks of years and commitment (Morrison, 1988:89-90). Leaders must learn how to relate to a growing workforce diversity with more women, minorities, fewer workers from the "traditional" family backgrounds, and the aged. Expected future challenges to visionary leadership in the work place include overlapping job

responsibilities, new rewards for innovative work, assignment of projects to entrepreneurial individual(s) or groups, expanded opportunities, local autonomy, and more tolerance of failure (Sheridan, 1988:50).

Technology, Human Capital, and Visionary Leadership Implications to the Design of Education

The single most significant tool available in the design of education for human capital development will be technology. Artificial intelligence; voice, visual, and information data banks; notebook computers; and expert systems will be made easily accessible by individual(s) for work or self development. Intelligent systems will be able to guide individual(s) expertly through information in many databases using real time simulations. Individual(s) can use this process to conceptualize, dream, solve problems, or learn new concepts as part of lifelong learning. Education, training, or real world application of this tool will be individualized and self-directed. A subject matter expert, human or artificial intelligence, would be on-line, as required, to provide guidance and direction based on individual capabilities. Technology will significantly contribute to an individual actively participating in lifelong learning because technology has provided clearer expectations, more timely feedback, more adequate resources, and demonstration of results.

One of the implications from the impact of technology has been the emergence of the importance of credible human

capital development to overcome the increasing incidence of functional illiteracy and skill obsolescence within the workforce. This idea supports the accommodation of technology because it attempts to maintain the functional literacy of individual(s) and currency in job skills and thus enhance productivity. Unacceptable skill deficiencies are normally uncovered when retraining individual(s) on new emerging technology.

A tremendous gap exists between the current functional literacy of the workforce graduating from the design of the educational system and what industry and the military need in today's work place. Employees without adequate functional literacy, information processing skills, and critical thinking, especially the skill of gaining access and interpreting the information from networked databases, are the information poor, second class citizens, and at a serious social, political, and economic disadvantage (have nots) within society. They will be consistently in a lower socio-economic status resulting in being at-risk in achieving the American Dream through more education and training.

Educators must abandon the lockstep, competency-based curriculum and devise instructional strategies for the development of higher-order comprehension (critical thinking) skills (Hoyt, 1988:33-34). Traditional instructional methods no longer serve today's needs. In industry, education, and the military the worker must be

flexible, willing to learn new skills, self-directed, creative, good with time management, and a thinker (Gould, 1989:31).

Education for sustainment of an acceptable level of functional literacy for the workforce will be an integral part of lifelong learning. It will be more job-related and supervisor guided using some form of embedded or modified on-the-job training with an intelligent, interactive program. Training will be built in to do all types of service, technical, information processing, and supervisory tasks. During some portions of the work day, the individual will be concerned with real time production toward the organization's goal. During another portion of the work day, (s)he will concerned with training on emerging technology or skills enhancement for personal development. Each individual level of competence and proficiency to do the job will determine the type, individual will participate in accomplishing competent job performance together.

Education for individual needs will be more focused, efficient, and effective through individualized realization of needs and requirements in today's society. Individual(s) will be able to discuss their career and life style goals with education specialists or training developers who have access to immense amount of information from networked data bases. The education subject matter experts will be able to help individual(s) map out plans for a sequence of self-directed learning projects. Each individualized plan would

be an identification of learning needs and then linking them with applicable learning resources through on-line learning systems and networking of appropriate databases.

The design of education must be familiar with the emerging educational technologies (Rummel & Holland, 1988: 36), develop good tools for student analysis and instructional design and be comfortable using "electronic mail," videoconferencing, or the telecommunication technologies. Education must emphasize teamwork and partnership that demands greater cooperation, communication, commitment, and team building. More than ever, education will need to make good use of multiple communications, media-voice, data, video, and text (Mojkowski, 1986:48). Educational leadership should become less of a decision maker and more of a creative facilitator with the faculty to provide the visionary leadership to work critical issues in today's fast-paced society.

The real mission of the design of education is to place the "power of civilization inside each individual" (Carkhuff, 1986:248) while also allowing education to simplify the individual's fulfillment of his or her destiny. VTO-E has the opportunity to take the lead in providing education that opens access to technology, information, and the knowledge of how to used this information. This access provides opportunities to individual(s) for power, influence, and success in life and career stages of human capital development.

REFERENCES

Ayers, William. "What Do 17-Years-Old Know?" Education Digest, 36-39. April, 1988.

Baker, Nancy C. "Would You Hire Them." Nation's Business, 77/4:16-19,22,26. April, 1989.

Barrett, Anita G. "Read, Revise, Rewrite, and Re-read: The Realities of the Practicum Process." Address at 1989 Summer Institute, Palm Springs, California. July, 1989.

Blanchard, Kenneth, and Norman Vincent Peale. The Power of Ethical Management. New York: William Morrow and Company, 1988.

Brown, Mark G. "How to Improve Performance with Better Data." Performance & Instruction, 28/3:1-5. March, 1989.

Bushnell, David S. "Toward Greater Productivity in the Year 2000." Resource Management, 53:17-22. July, 1988.

Carkhuff, Robert R. "Education and the Advancement of Civilization." Education, 106/3:241-249. Spring, 1986.

Carnevale, Anthony; Leila Gainer; Ann S. Meltzer; and Shari L. Holland. "Workplace Basics: The Skills Employers Want." Community, Technical, and Junior College Journal, 59/4:28-33. February/March, 1989.

Carnevale, Anthony, and Eric R. Schultz. "Technical Training in America: How Much and Who?" Training & Development Journal, 42/11:18-32. November, 1988.

Carter, Phillip D. "Revitalizing Society: Practicing Human Development Through The Lifespan." Lifelong Learning, 11/6:27-31. June, 1988.

Cetron, Marvin. The Future of American Business. New York: McGraw-Hill, 1985.

Clabaugh, Gary, and Edward G. Rozycki. "Politics, Consensus, and Educational Reform." Educational Horizons, 67/1&2:6-12. Fall/Winter, 1989.

Cleveland, Harlan. The Future Executive. New York: Harper & Roe, 1985.

Concilio, Richard V. "Begging For Training." Management World, 17/1:39. January/February, 1988.

DiMarco, Nicholas; Jane R. Goodson; and Henry F. Houser. "Situational Leadership In a Project/ Matrix Environment." Project Management Journal, 20/1: 11-18. March, 1989.

Drucker, Peter F. "The Coming of the New Organization." Harvard Business Review, 88/1:45-53. January-February, 1988.

Duckett, William. "Using Demographic Data For Long-Range Planning." Phi Delta Kappan Journal, 166-170. October, 1988.

Elmandjra, Mahdi. "Learning Needs in a Changing World." The Futurist, 21/7:60. March-April, 1987.

Erkkila, John, and Brendan Murphy. "Strategic Information: An Economic Analysis and Case Study." Information Management Review, 4/3:25-36. Winter, 1989.

Farkas-Conn, Irene S. "Human Aspects of Information Management for Technology Transfer." Information Management Review, 4/2:47-56. Fall, 1988.

Foster, Badi; Gerald Jackson; William E. Cross; Bailey Jackson; and Rita Hardiman. "Workforce Diversity and Business." Training and Development Journal, 42/4:38-42. April, 1988.

Fritz, Norma R. "A Good Entry-Level Employee is Hard to Find." Personnel, 65/5:10. May, 1988.

Gayeski, Diane M. "Can (and Should) Instructional Design Be Automated?" Performance & Instruction, 27/10:1-4. November/December, 1988.

Georges, James C. "The Hard Reality of Soft-Skills Training." Personnel Journal, 68/4:41-45. April, 1989.

Geroy, Gary, and Michael G. Erwin. "Assessing Literacy in the Workplace." Performance & Instruction, 27/5:32-38. May/June, 1988.

Giroux, Henry A. "Rethinking Education Reform In The Age Of George Bush." Phi Delta Kappan, 70/9:728-730. May, 1989.

Gould, Sandy. "From Education to Industry: How to Make the Transition." Performance & Instruction, 28/3: 31-33. March, 1989.

Groff, Warren. "Emergence of VTO-E." Address at 1989 Summer Institute, Palm Springs, California. July, 1989.

Hamel, Gary, and C.K. Prahalad. "Strategic Intent." Harvard Business Review, 67/3:63-76. May/June, 1989.

Herren, Laura M. "The Right Recruitment Technology for the 1990's." Personnel Administrator, 34/4:48-52. April, 1989.

Herrscher, Barton R. "Curriculum Integrity: An Imperative in Educating the At-Risk Student." Address at 1989 Summer Institute, Palm Springs, California. July, 1989.

Hersey, Paul, and Kenneth H. Blanchard. Management of Organizational Behavior: Utilizing Human Resources. Englewood Cliffs: Prentice-Hall, 1982.

Hirschhorn, Larry. Beyond Mechanization. Cambridge: MIT Press, 1984.

Hodgkinson, Harold. "Changing Society, Unchanging Curriculum." Phi Kappa Phi Journal, 8-11. Summer, 1987.

Hodgkinson, Harold. "Using Demographic Data For Long-Range Planning." Phi Delta Kappan, 160-170. October, 1988.

Hoyt, Kenneth B. "The Changing Workforce: A Review of Projections--1986 to 2000." The Career Development Quarterly, 37/3:31-38. September, 1988.

Kutscher, R.E. "Projections 2000: Overview and Implications of the Projections to 2000." Monthly Labor Review, 110/9:3-9. September, 1987.

Lindsey, James. "The Challenge of Designing for Interactive Video." Instructional Innovator, 29/6:17-19. September, 1984.

Mangum, Stephen, and David E. Ball. "Military Skill Training: Some evidence of Transferability." Armed Forces & Society, 13/3:425-442. Spring, 1987.

Mayes, Cheryl. "Five Critical Thinking Strategies For Adult Basic Education Learners." Lifelong Learning, 10/7:11-13,25. May, 1987.

Meltzer, M.F. Information, The Ultimate Management Resource. American Management Association, New York, NY, 1981.

Merrill, Michael H. "A Helping Hand: Educational Programs for the Functionally Illiterate." Lifelong Learning, 11/7:25-27. May, 1988

Metz, Steven. "Why Aren't Americans Better at Strategy." Military Review, 64/5:9-15. May, 1989.

Morrison, James H. "Profiling the New HR Management Style." Personnel Administrator, 33/6:88-90. June, 1988.

Mojkowski, Charles. "The Principal and Technology: Beyond Automation to Revitalization." Educational Leadership, 43/6:45-48. March, 1986.

Naisbitt, John. Megatrends: Ten New Directives Transforming Our Lives. New York: Warren Books, 1984.

Nelson-Horchler, Joani. "Demographics Deliver A Warning." Industry Week, 236/8:58. 18 April, 1988.

Newell, Terry. "The Future and Federal Training." Public Personnel Management, 17/3:261-271. Fall, 1988.

Olfiesh, Gabriel D. "DVI: Giant Step for CD-ROM." Instruction Delivery Systems, 1/3:5-7. 1987.

Pava, Calvin. "Redesigning Sociotechnical Systems Design: Concepts and Methods for the 1990s." The Journal of Applied Behavioral Science, 22/3:201-221. 1986.

Pollick, A. "Automating Offices to Give Managers a Competitive Edge." New York Times, 38. 10 January, 1982.

Ponitz, David. "Community Colleges Can Help American Manufacturing Be More Competitive." AACJC, 59/4:8. February-March, 1989.

Porter, Alan. "Work in the New Information Age." The Futurist, 20/5:9-14. September-October, 1986.

Reeves, Thomas C. "Research and Evaluation Models for the Study of Interactive Video." Journal of Computer-Based Instruction, 13/4:102-106. Autumn, 1986.

Reich, Robert B. "Teaching to Win in the New Economy." Technology Review, 91/6:24-25. August/September, 1988.

Rochart, John F. and James E. Short. "IT in 1990's: Managing Organizational Interdependence." Sloan Management Review, 30/2:7-17. Winter, 1989.

Rummel, Patricia A. and Thomas E. Holland, Jr., P.E. "Human Factors are Crucial Component of CIM (Computer Integrated Manufacturing) System Success." Industrial Engineering, 20/4:36-42. April, 1988.

Russo, Charline. "The Changing Workplace." CUPA Journal, 63/2:1-5. Fall, 1988.

Sheridan, John H. "The Fortess Walls Come Tumbling Down." Industry Week, 50. 18 April, 1988.

Shuster, Frederick E. "Reviving Productivity in America." Personnel Administrator, 33/7:65-68. July, 1988.

Smith, Peter and Samual Dunn. "Tomorrow's University: Serving the Information Society--Getting Ready for the Year 2000." Educational Technology, 25/7:5-11. July, 1985.

Stoler, Peter. The Computer Generation. New York: William Morrow, 1984.

Toffler, Alvin. The Third Wave. New York: William Morrow and Co. Publishers, 1980.

Varcoe, Kenneth E. "The Learning Society: How Will Teaching and Learning be Different in the Year 2001." Address at 1989 Summer Institute, Palm Springs, California. July, 1989.

Varcoe, Kenneth E. "The Preferred Future: Actions Today to Prepare the Workforce for 2001." Address at 1989 Summer Institute, Palm Springs, California. July, 1989.

Weiner, Edith and Arnold Brown. "Human Factors: The Gap Between Humans and Machines." The Futurist, 23/3:9-11. May/June, 1989.

Wiseman, Charles. Strategy and Computers: Information Systems as Competitive Weapons. Homewood: Dow-Jones Irwin, 1987.

Wright, Earl L. "Imperative for the Year 2001: Educational Renewal and a Thinking Labor Force." Address at 1989 Summer Institute, Palm Springs, California. July, 1989.

Wright, Patricia. "Functional Literacy: Reading and Writing at Work." Ergonomics, 31/3:265-289. March, 1988.

Zemke, Ron. "Training in the '90s." Training, 24/1:40-53. January, 1987.

Zierath, David L. "The Social Context of Being At-Risk." Address at 1989 Summer Institute, Palm Springs, California. July, 1989.

Zuboff, Shoshana. In The Age Of The Smart Machine. New York: Basic Books, 1988.

Appendix A

Analysis I

SIGNIFICANT CONCERNS	IMPLICATIONS
FUNCTIONAL LITERACY. Individual inability to use written information effectively in emerging technical/automated workplace of information/service based society. Not enough to just comprehend written materials or be at selected reading grade level. Involves cognitive processes of reading complex/technical written materials (technology), interpreting information for intended outcomes (thinking), and ultimately accomplishing desired task successfully (productivity) in relation to its implications and effect in the individual's environment. Computer literacy is significant. Unsatisfactory high rates in women, minorities, and 20-39 age group. White majority has greatest numbers. Individual(s) must cope with office automation systems, information processing networks, and expert knowledge systems in his/her environment.	Employees without adequate functional literacy skills are information poor, second class citizens, and at a serious social, political, and economic disadvantage (have nots) within society. "New organizations" are dynamic and high technology dependent. VTO-E has not kept pace and has yet to take the problem of adult functional illiteracy seriously because it is treated as a personal misfortune rather than as a real and serious threat to the nation's standard of living and well being. Demand for U.S. business to be competitive internationally and the need to reverse a declining rate of productivity are placing new expectations on VTO-E. VTO-E must contribute more to technical, economic, & social development
INFORMATION PROCESSING SKILLS(IPS). Just as the spread of the telegraph, postal service, telephone, and typewriters created the conditions that allowed organizational structures to respond to the Industrial Revolution, so has IPS in relation to today's information/service society. Information is now substituted for both energy/ labor and material/capital. Information has always been a resource, but poorly understood. Knowledge is power but it is not clearly true that information is the equivalent of knowledge. Individual(s) with adequate IPS and organization(s) with effective information management routinely access traditional government and industry databases. A desktop computer can make a trained individual more efficient or fifteen percent in productivity. IPS include word processing, network(s) manipulating, analysis, electronic mail, and telecommunications.	Information is a strategic tool that organizations must learn to use in these times of limited economic growth, increasing technological advancements, an increasingly segmented society, and a changing system of social values. An individual or small organization can now have as much information/power that was once only available to government or a large corporation. Ability to possess absolute information incurs a legal liability for the total correctness of its use and removes the shield of ignorance. Projected "paperless office" has not materialized. Development of information processing skills requires a rethinking of traditional views on the importance of formal, in-class training, adequacy of "hands on" experience, and excessive time away from the job.
CRITICAL THINKING SKILLS. The area of higher order comprehension (critical thinking) skills is more significant in today's information/service society than ever before. Ability to think critically in the solution of problems is one of the most important abilities in today's fast paced society of technology, information processing, and quick decisions. Individuals developing skills in critical thinking not only enhance survival in the job market but also assess, criticize, and take better control of their lives. This ability can enhance the functional efficiency of individuals responsible for day-to-day operations and even overall strategy and "visioning" development. Thinking skills are critical to effective leadership in "new" organizations.	Educators must abandon the lockstep, competency-based curriculum and devise new higher order comprehension (thinking) skills development strategies. The "new" worker must be flexible, willing to learn new skills, self-directed, creative, good with time management, and a thinker. Good jobs are information/service work requiring brainwork, knowledge, conceptualization, intellectual performance, and critical thinking--uniquely human functions that automation or expert systems can only help. Technology becomes useless without expert knowledge training. The new norm is workers with good critical thinking skills in small information/service organizations of twenty-five people or less being more productive.
CHANGING WORKFORCE. While the "baby bust" of the 1970's reduces the pool of entry level workers, the number of middle-aged "baby boomers" increases nationally by 50 percent between 1975-1993. They aspire to mid-management jobs previously promised in traditional industrial organizations, but these jobs are declining because of the active stream-lining of information/service organizations for productivity under automation. Million working-age immigrants enter the U.S. each year, many of them with limited language and job skills. 700,000 youth drop out of school each year. Workforce views VTO-E as not relevant.	Young people entering the work force now will change occupations about four times during their careers and two of these occupations do not even exist yet. Women, aged, and racial minorities are disproportionately found in the non-expert, deskilled jobs, underemployed and unemployed. Inability of middle-age "baby boomers" to "move up" may lead to intergenerational, interracial, and intergender tensions. 3/4 people now in the workforce will require training/ retraining to fill "new" jobs created by emerging technologies.
INSTRUCTIONAL TECHNOLOGY. Technology is the trigger that continually transforms all aspects of the information/service society. The Army is grasping this expensive instructional technology through a big investment to enhance its war-fighting capabilities. The status quo of Army education would have remained the same except for three recent technological developments that are driving or triggering Army acceptance of this wave of technology into its war-fighting ranks and educational institutions. Technological hardware costs are more acceptable. The number and quality of traditional curriculum related programs are increasing. Education is experiencing a "computer revolution."	Even more acceptance is anticipated with emerging artificial intelligence, expert systems, authoring menus, "finger-on-glass," notebook computers, speech processing, and telecommunications. The best features of automated and human instruction used together in the classroom. Humans are highly interactive, flexible, and adaptable. Technology is reliable, tireless, specific, and consistent. Computer assisted training is of special interest because of its potential application in training soldiers to think and conceptualize doctrine with guided self-directed learning in a highly interactive learning environment.

Appendix B

Schedule of Presentations Attended

1989 SUMMER INSTITUTE ATTENDANCE

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
0800-0930		Keynote Address					
0830-0930			Learning Society		Computer Illiterates	Practicum Presenters	
0830-1200				Special Seminar			Special Seminar
0945-1045		Raising Questions	Imperative for 2001		Curriculum Integrity	Practicum Presenters	
1100-1200		Special Seminar	Special Seminar		Special Seminar	Special Seminar	
1300-1700	Special Seminar						
1330-1430		Preferred Future	HARP Discussion		Alumni Panel Discussions	Practicum HARPS	
1445-1545		Social Context	Practicum Discussion		Practicum Discussions	Practicum/ HARPS	
1600-1700		Higher Ed Philanthropy	HARP Discussion		Future Workplace	Education in 21st Century	
1715-1800	Cluster Meeting	Cluster Meeting	Cluster Meeting		Cluster Meeting	Cluster Meeting	

Appendix C

Analysis II

SIGNIFICANT CONCERNS	IMPLICATIONS
EMERGENCE OF VTO-E SEMINAR (Groff). Education must change to meet the needs of today's changing society. The workforce is aging. The new workers are minorities, women, & immigrants. 1990s will be decade of children/youth. Use electronic highways for advocacy.	Emergence of VTO-E must be sensitive to skills for today's society, arrival of technology, and automated office. VTO-E must train women, minorities, immigrants, & aged for jobs in service industries that demand higher skill levels and costs.
EXODUS ADDRESS (Justis). Nation is changing from a white, male, single-language society to multi-cultural/lingual. Age cohort younger in minorities. Slight increase in high school graduates but a decline in college participation. Financial aid is not supportive.	More disenchanted groups with the American Dream. Highly polarized America exists: Blacks, Hispanics, & Asians. Threat exists to the essence of the democracy/American Dream. Loss of sense of vested interest. Must turn around doom and gloom.
RAISING QUESTIONS (Lesak). Students are academically under- prepared. Difficult to measure outcomes of remedial instruction & justify costs. Remedial programs not consistent. Must be aware of types of students. Graduates of remedial programs have difficulty competing.	Must do a better job of showing true contribution of remedial training programs. Some form of follow-on program is required to track graduates. As long as talent is diverse, there will always be remedial effort. Is open access worth it?
EMERGENCE OF VTO-E (Fairly). Educators never get together to work issues. Can't work problems in isolation. 1/3 of students are disadvantaged or at-risk. Only 5% of teachers are minority. New (88%) entrants in workplace are minority, women, & immigrants. Diversified.	People w/o adequate education/training are information poor, second class citizens, & at a serious social, political, & economic disadvantage (have nots). VTO-E must contribute more to nation'stechnical, economic, & social development.
PREFERRED FUTURE (Varcoe). Destiny: Where are we going? Technical info doubles every 10 years. 10% of technical info obsolete annually. Paradigm shifts exist. Must now develop a preferred scenario/vision of the future. Educators must understand demographics & trends.	"New organizations" are dynamic & high technology dependent. Demand for U.S. business to be competitive internationally & the need to reverse a declining rate of productivity are placing new expectations. Information is a strategic tool.
SOCIAL CONTEXT (Zierath). Must understand the social context of being at-risk. Being at-risk is a matter of degree and can vary within categories. Elites of organization will not tolerate loss of control. No inherent connection among at-risk groups. Well being threatened.	No clear definition of being at-risk exists to help solve the problem. Society is being threaten by demographics, technology, & a global perspective. Education can be part of the problem or be part of the solution for tomorrow's needs.
HIGHER ED PHILANTHROPY (Melchiori). Philanthropy is part of developmental. Commitment is to move ahead. Current tax structure supports philanthropy. Growing body of literature exists on fund raising. Many educational professional organizations exist to help.	Philanthropy is often misunderstood. The contribution of this effort is not recognized for what it can do for the organization. Best to put this in the development office and have unique individuals proactive with the community and industry.
LEARNING SOCIETY (Varcoe). Knowledge explosion. More joblessness among least skilled. Less joblessness among skilled. New kind of worker. Poor skills block access to the American Dream. Human capital is nation's wealth. Difficult to measure contribution of education.	The "new" worker must be flexible, willing to learn new skills, self-directed, creative, good with time management, & a thinker. The best features of automated and human instruction used together in the classroom. Lifelong learning.
IMPERATIVE FOR THE 2001 (Wright). Education serves as primary catalyst. Workforce lacking basic skills, computer literacy, and ability to compete. Decreasing monetary value of formal Higher Ed. Young people think economic not global. "Have nots" become a tax burden.	Changed concept of work. More diversified workforce. Higher Ed must prepare graduates with global perspective. Must have more partnerships with education, industry, government, & the military. Better defined strategic economic goal for the U.S.
MARP RESOURCES (Bessell). New MARP prospectus format out soon. MARP must be something you love, important to you, and will live with till completion. Don't fight your organization with MARP. Look for a MARP within yourself, own workplace, and problem definition then read.	Selection of a MARP topic is more than just dusting off a previous effort or conducting a literature search for a comfortable subject area. The MARP effort is very important and must be a heavily committed effort & therefore it is you.
PRACTICUM REPORT (Bryant). Must put pen to paper and write, read, re-read, and proof-read. Read the draft out loud to catch punctuation mistakes and other errors. Style is formal with no dialogue in Practicum/MARP. Use a logical progression of ideas that reads well.	Better standardization for the final report. Will be easier to move on the the MARP effort after working practicum reports in the same formal style. Must write the report to be read, corrected, re-read, and finalized to the best possible.
PRACTICUM REPORT (Robinson). New practicum report format looks more like the MARP style. Write the report in formal style while answering the proposal. Report must pass the "so what" test in that it serves a useful purpose, creative and answers a need within the organization.	The practicum report is more than just the results written down. It should be treated as a creative opportunity to treat significant problem within the organization. The report must be written in formal style & in the high standards of Nova.

COMPUTER ILLITERACY (Cook). Floating level of computer literacy exists. Fear of computers causes people to be left behind. Change is threatening. Too few computers and trained teachers hurts the arrival of the information age and automated office. Computers equal power.

VTO-E has not kept pace and has yet to take the problem of computer illiteracy seriously because it is treated as a personal misfortune rather than as a real and serious threat to the nation's standard of living and well being.

CURRICULUM INTEGRITY (Herrscher). What does an individual need to know? Each individual has the right to learn but has been routinely denied this right. Establish outcomes to teach to. Target curriculum to the needs of students. Be consistent with the education mission.

Curriculum must have a vertical structure consistent with the institution's mission, goal, objectives, and desired learning outcomes. Systematic validation ensures accountability and curriculum validation to be consistent with mission.

INVESTING IN HUMAN CAPITAL (Herpoll). Concept of human capital is difficult to explain. How to measure a nation's wealth in terms of human resources. Human capital discussed in terms of knowledge, motivation, skills, & energy that can be harnessed to produce goods.

People take education sometimes just for the consumption, rather than investment. Difficult to prove there is a better rate of return in investing in education than physical capital. It must be linked to the computation of GNP/wealth.